

What is claimed is:

1. A method for producing a photonic crystal made by periodically aligning a first dielectric and a second dielectric of which the relative dielectric constant differs from that of the first dielectric, the method comprising:

a slurry-depositing step of continuously jetting out a slurry of a dielectric powder to give the first dielectric through a jet printhead onto a substrate to thereby deposit a dielectric layer thereon,

a slurry-drying step of removing solvent of the slurry from the dielectric layer,

a binder-printing step of jetting out a binder through a jet printhead onto a predetermined part of the dielectric layer from which the solvent of the slurry has been removed to thereby infiltrate the binder into the predetermined region of the dielectric layer,

a binder-drying step of removing solvent of the binder having penetrated into the predetermined region of the dielectric layer to thereby bind the dielectric powder with the binder that exists in the predetermined region of the layer, and

a powder-removing step of removing dielectric powder not bound with the binder in another region of the dielectric layer to thereby form a region in which the second dielectric is to be disposed.

2. The method for producing the photonic crystal as claimed in claim 1, wherein the slurry-depositing step, the slurry-drying step, as well as the binder-printing step and the binder-drying step are repeated predetermined times, and then the powder-removing step is effected to thereby form blocks of the first dielectric.

3. The method for producing the photonic crystal as claimed in claim 1, which further comprises a binder-curing step of curing the binder having been infiltrated into the predetermined region of the dielectric layer in the binder-printing step.

4. The method for producing the photonic crystal as claimed in claim 1, wherein at least one of the first and second dielectrics is a material selected from the group consisting of: BaO-TiO₂ and Al₂O₃.

5. The method for producing the photonic crystal as claimed in claim 1, wherein one of the first and second dielectrics is air.

6. The method for producing the photonic crystal as claimed in claim 1, wherein the powder-removing step is followed by a firing step of firing the region of the dielectric layer in which the second dielectric is to be disposed.

7. A method for producing a photonic crystal made by periodically aligning a first dielectric and a second dielectric of which the relative dielectric constant differs from that of the first dielectric, the method comprising:

a slurry-depositing step that includes a first depositing step of jetting out a first slurry of a first dielectric powder to give the first dielectric through a jet printhead onto a predetermined part of a substrate to thereby form a first dielectric layer in that part and a second depositing step of jetting out a second slurry of a second dielectric powder to give the second dielectric through a jet printhead onto the other part of the substrate not having the first slurry therein to thereby form a second dielectric layer in the other part of the substrate,

a slurry-drying step of removing solvent of the first and second slurries from the first and second dielectric layers,

a binder-printing step of jetting out a binder through a jet printhead onto a predetermined part of the first and second dielectric layers from which the solvent has been removed to thereby infiltrate the binder into the predetermined regions of the first and second dielectric layers, and

a binder-drying step of removing solvent of the binder having penetrated into the predetermined regions of the dielectric layers to thereby separately bind the first and second dielectric powders with the binder that exists in the predetermined regions of the layers.

8. The method for producing the photonic crystal as claimed in claim 7, wherein the slurry-depositing step, the slurry-drying step, as well as the binder-printing step and the binder-drying step are repeated predetermined times.

9. The method for producing the photonic crystal as claimed in claim 7, which further comprises a binder-curing step of curing the binder having been infiltrated into the predetermined regions of the dielectric layers in the binder-printing step.

10. The method for producing the photonic crystal as claimed in claim 7, wherein at least one of the first and second dielectrics is a material selected from the group consisting of: BaO-TiO₂ and Al₂O₃ .

11. The method for producing the photonic crystal as claimed in claim 7, wherein the binder-curing step is followed by a firing step of firing the first and second dielectric layers.

12. A photonic crystal made by periodically aligning a first dielectric and a second dielectric of which the relative dielectric constant differs from that of the first dielectric, wherein:

at least one of the first and second dielectrics is formed of a shaped body of dielectric powder and its relative density falls between 48 % and 63 %.

13. The photonic crystal as claimed in claim 12, wherein at least one of the first and second dielectrics has a relative dielectric constant of from 3 to 100.

14. The photonic crystal as claimed in claim 12, wherein the ratio of the relative dielectric constant of the first dielectric to that of the second dielectric falls between 4.7/7.3 and 1/100.

15. The photonic crystal as claimed in claim 12, wherein at least one of the first and second dielectrics is a material selected from the group consisting of: BaO-TiO₂ and Al₂O₃ .

16. The photonic crystal as claimed in claim 12, wherein one of the first and second dielectrics is air.

17. The photonic crystal as claimed in claim 12, wherein the periodic cycle of aligning the second dielectric in the first dielectric falls between 0.1 mm and 10 mm.

18. The photonic crystal as claimed in claim 12, wherein at least one of the first and second dielectrics is formed by firing the shaped body.